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Cassarino

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(54) **TWO-PIECE ROCKER ASSEMBLY**

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H01H 13/00	(2006.01)
H01H 23/14	(2006.01)
H01H 3/20	(2006.01)

(52) **U.S. Cl.**

CPC ***H01H 23/143*** (2013.01); ***H01H 3/20*** (2013.01); *H01H 2300/024* (2013.01); *Y10T 29/49105* (2015.01)

(58) **Field of Classification Search**

CPC H01H 23/00; H01H 23/02; H01H 23/04; H01H 23/14; H01H 23/16; H01H 23/24; H01H 27/00; H01H 2003/00; H01H 2003/02; H01H 2021/00; H01H 2221/00; H01H 2221/016; H01H 2223/00; H01H 2223/01; H01H 2223/012; H01H 2223/034; H01H 3/00; H01H 13/00

USPC 200/329, 336, 339, 529, 538, 557–559, 200/553, 401, 409, 457, 459

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,267,248	A *	8/1966	Bagley	H01H 23/14 200/330
4,002,874	A *	1/1977	Brown	H01H 9/26 200/321
4,169,972	A *	10/1979	Black, III	H01H 23/164 200/315
4,291,207	A *	9/1981	Reinke	H01H 27/00 200/325
5,250,771	A *	10/1993	Brusasco	B60R 16/005 200/292
6,545,239	B2	4/2003	Spedale et al.	

FOREIGN PATENT DOCUMENTS

EP	0653770 A1	5/1995
EP	1081730 B1	3/2001

* cited by examiner

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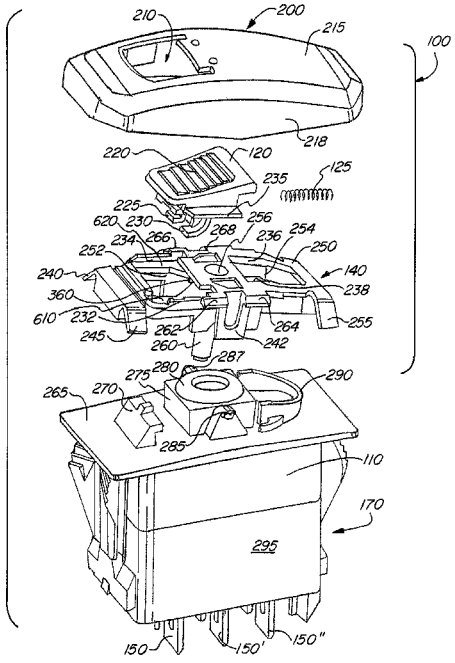
(57) **ABSTRACT**

A two-piece rocker assembly having an inner rocker and an outer rocker, the inner rocker being snap-fit into the outer rocker via a connection between at least one flange and at least one latch beam. In certain embodiments, a locking member is added to the two-piece rocker assembly.

18 Claims, 9 Drawing Sheets



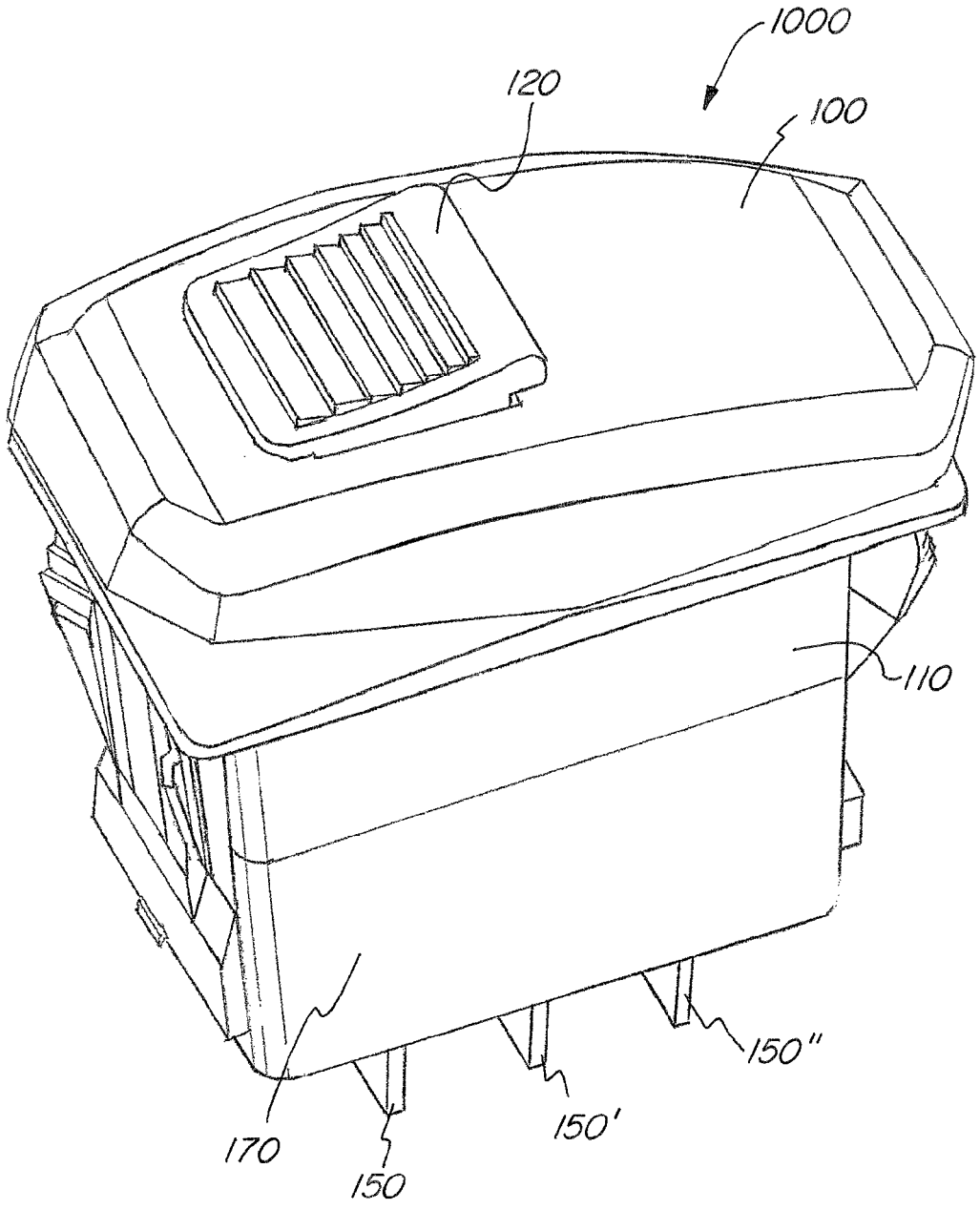


FIG. 1

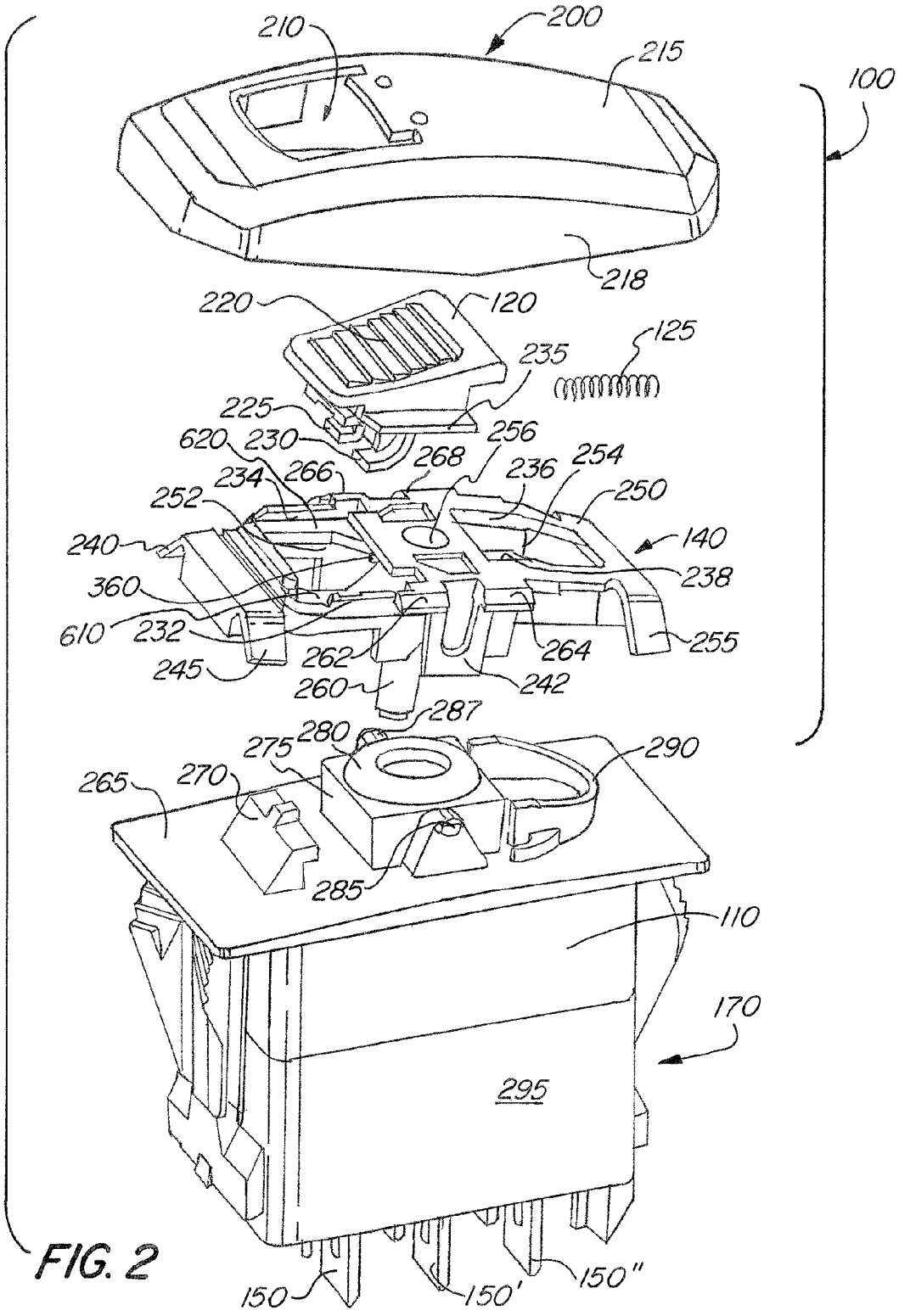

210
200
215
100
218
220
120
125
235
225
620
230
256
268
234
266
236
254
252
250
240
140
238
360
610
232
262
264
255
245
260
242
287
280
275
290
265
270
285
110
170
295
150
150'
150"

FIG. 2

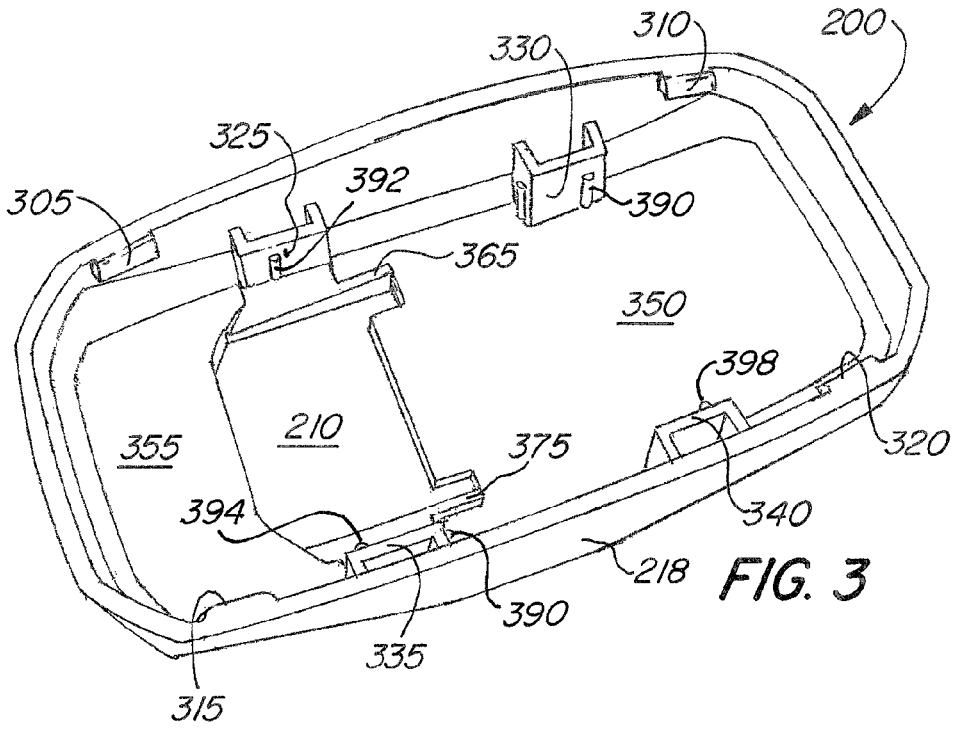

200
310
330
325
392
305
390
365
350
398
210
355
375
320
394
340
218
390
335
315

FIG. 3

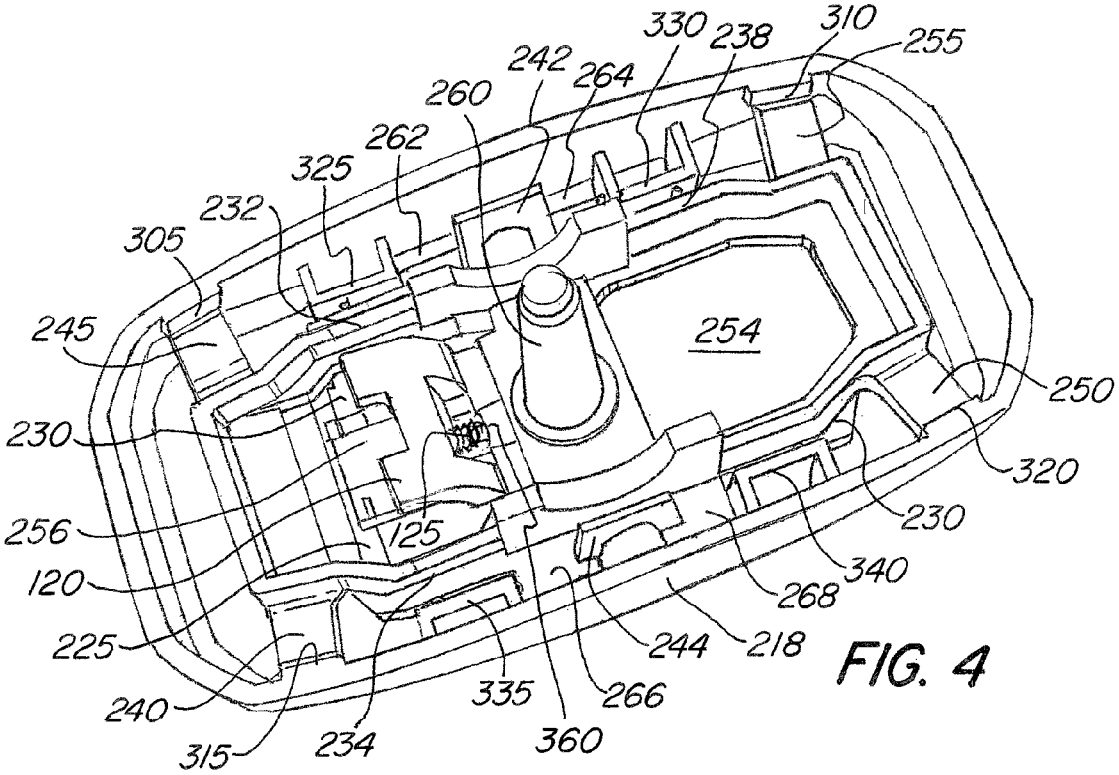

330
238
310
255
242
264
260
262
325
232
305
254
245
250
230
320
230
256
125
340
120
268
225
244
218
240
335
266
315
234
360

FIG. 4

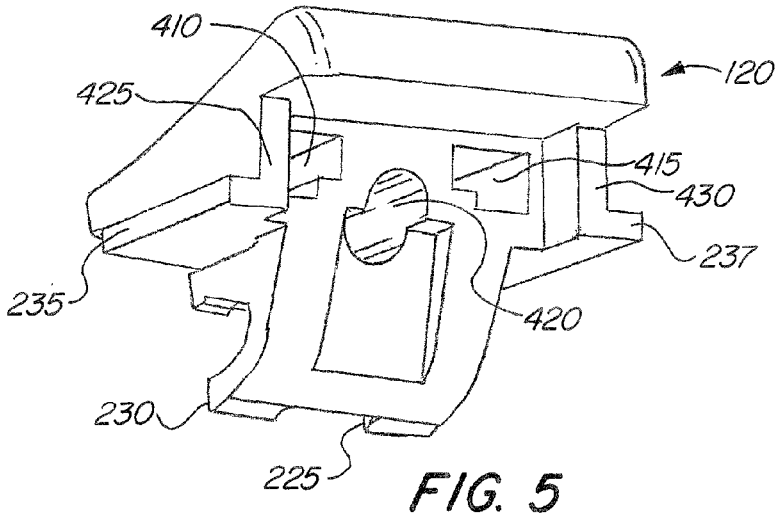

410
425
120
415
430
237
235
420
230
225

FIG. 5

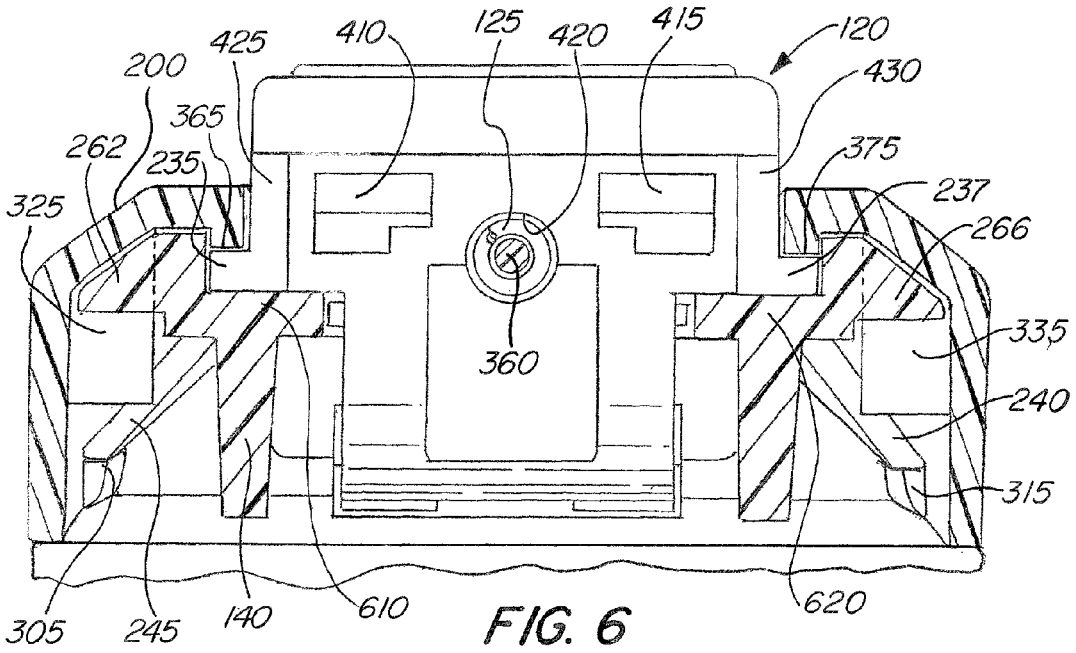

425
410
125
420
415
120
200
430
365
262
375
235
237
325
266
335
360
240
315
305
245
140
610
620

FIG. 6

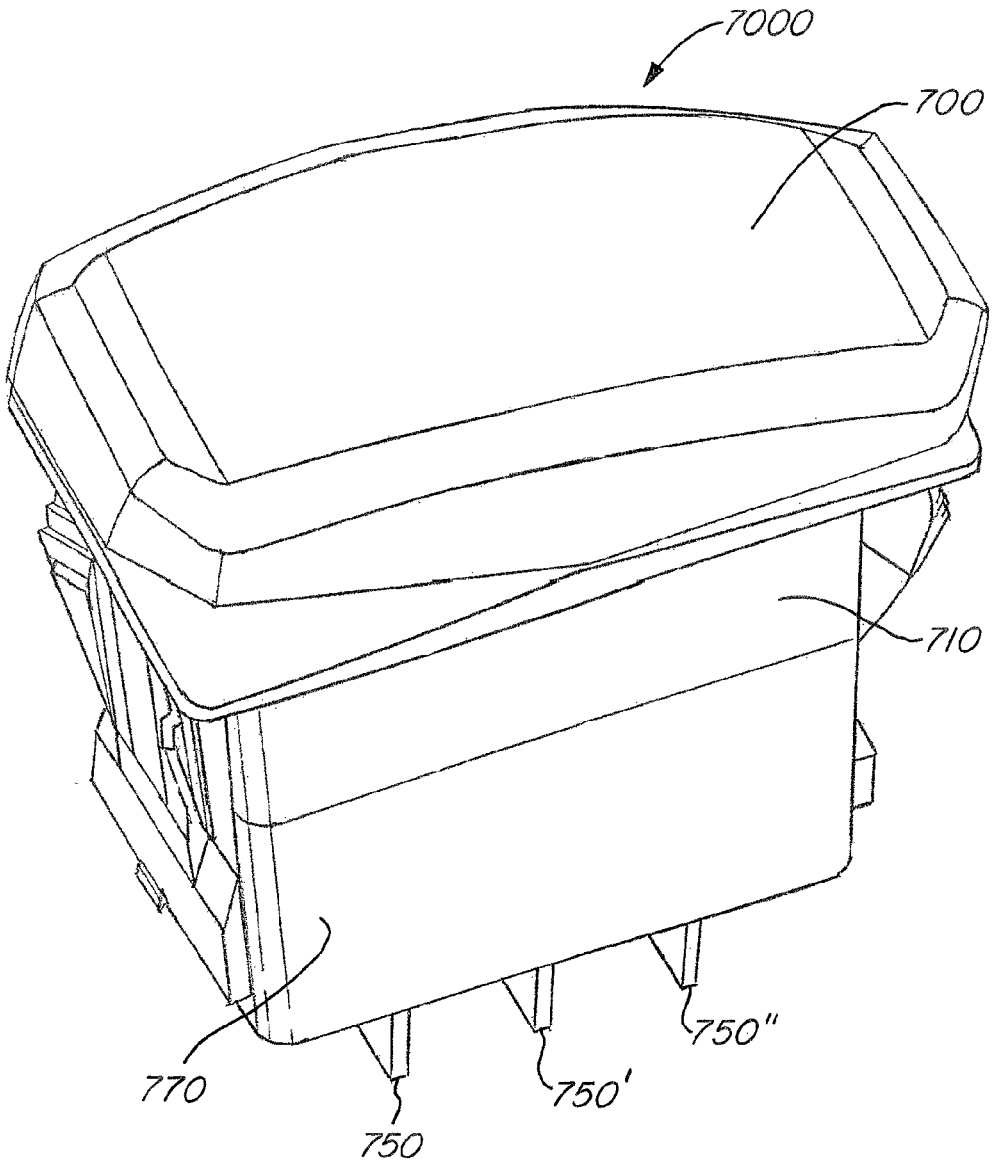


FIG. 7

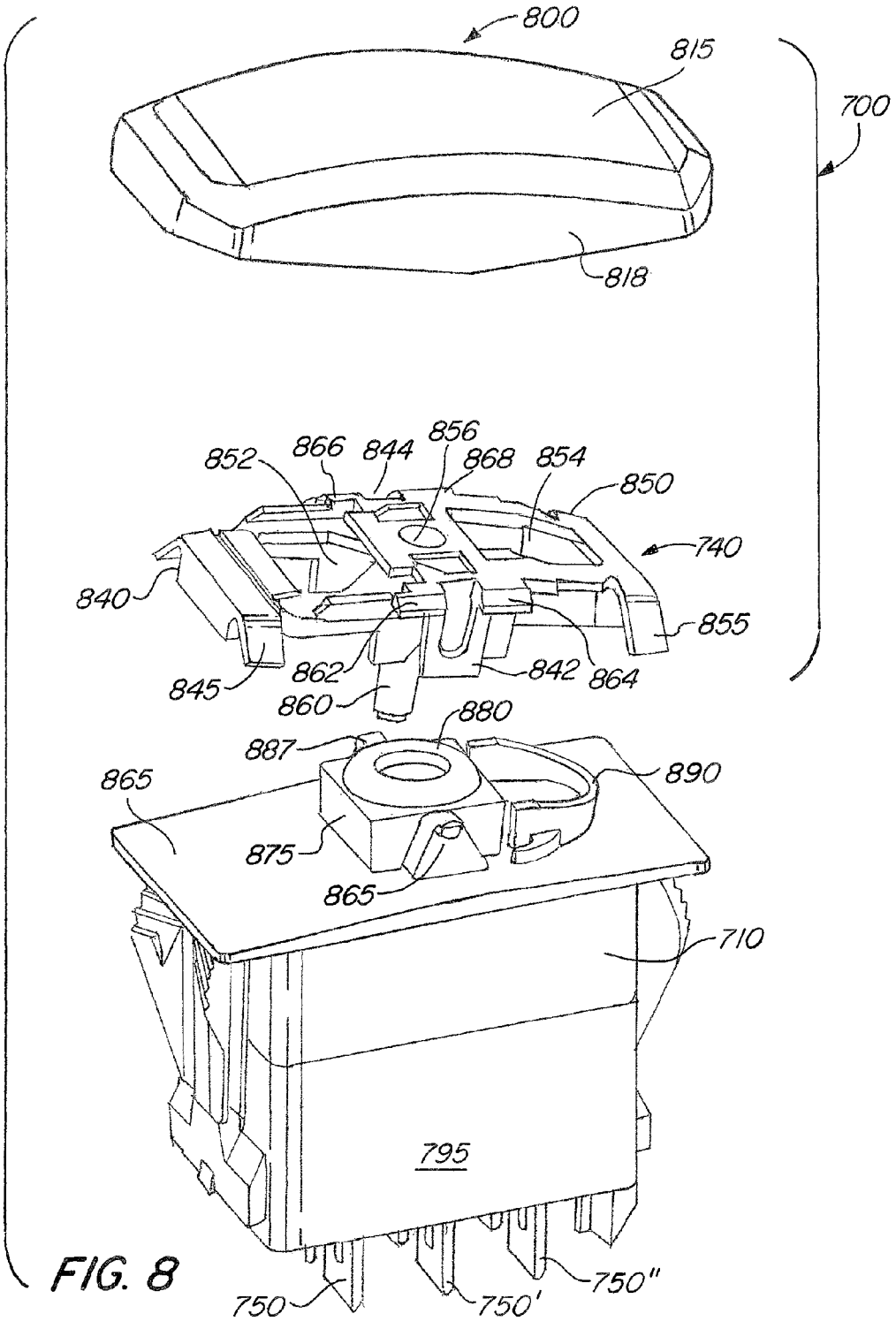

800
815
700
818
852
866
844
856
868
854
850
740
840
855
845
862
842
864
860
880
887
890
865
875
865
710
795
750
750'
750"

FIG. 8

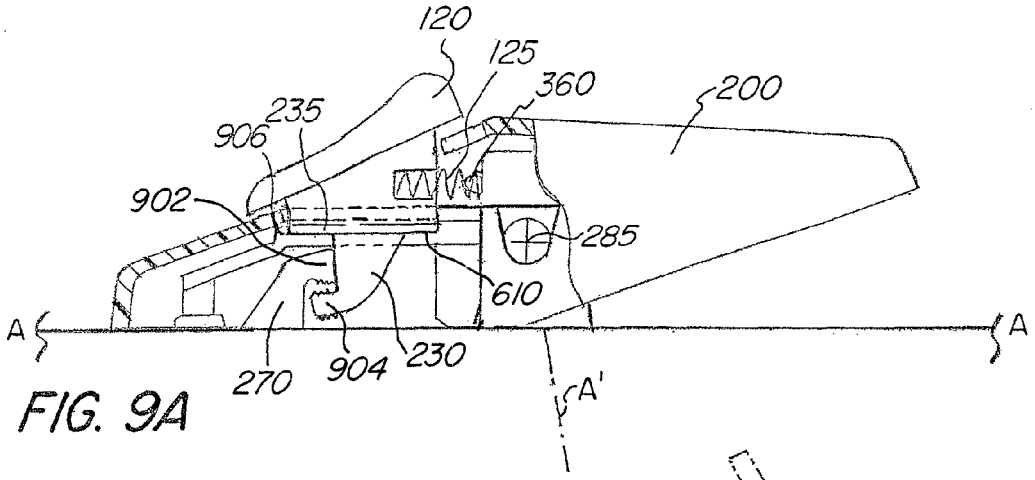


FIG. 9A

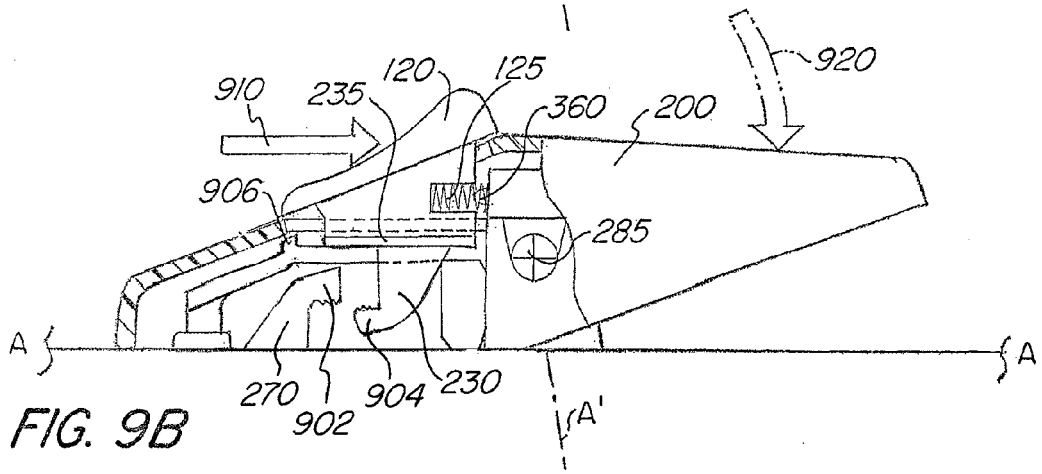


FIG. 9B

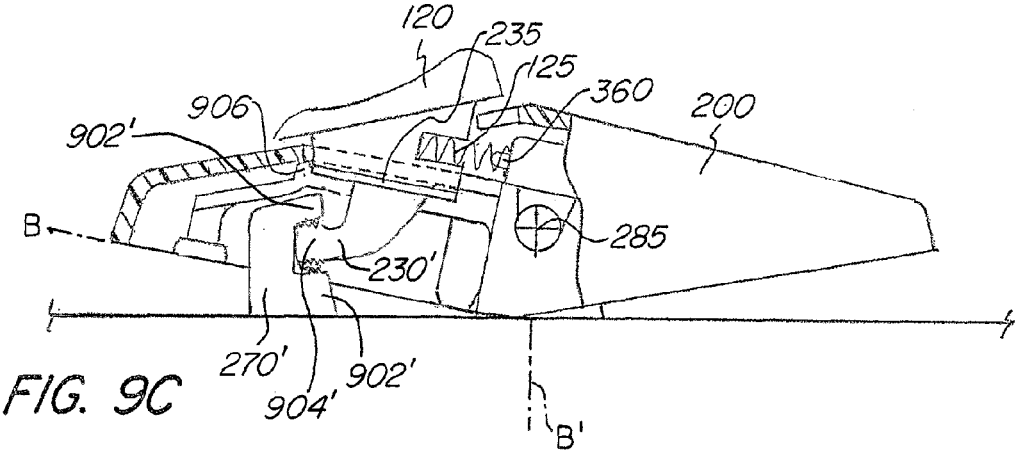


FIG. 9C

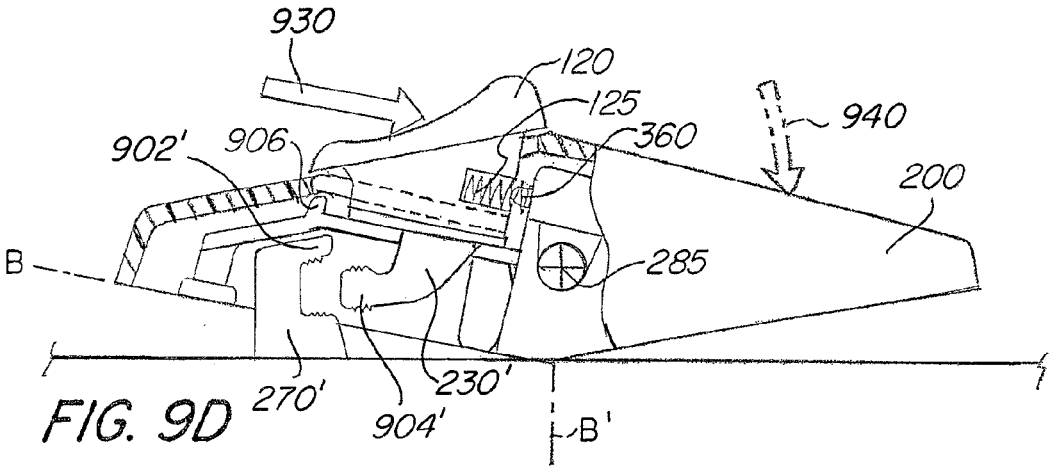


FIG. 9D

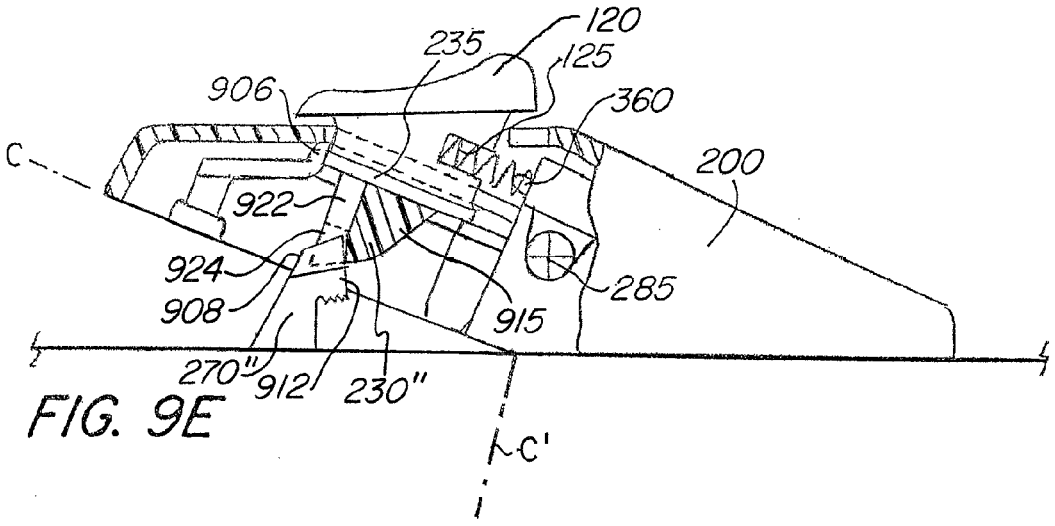


FIG. 9E

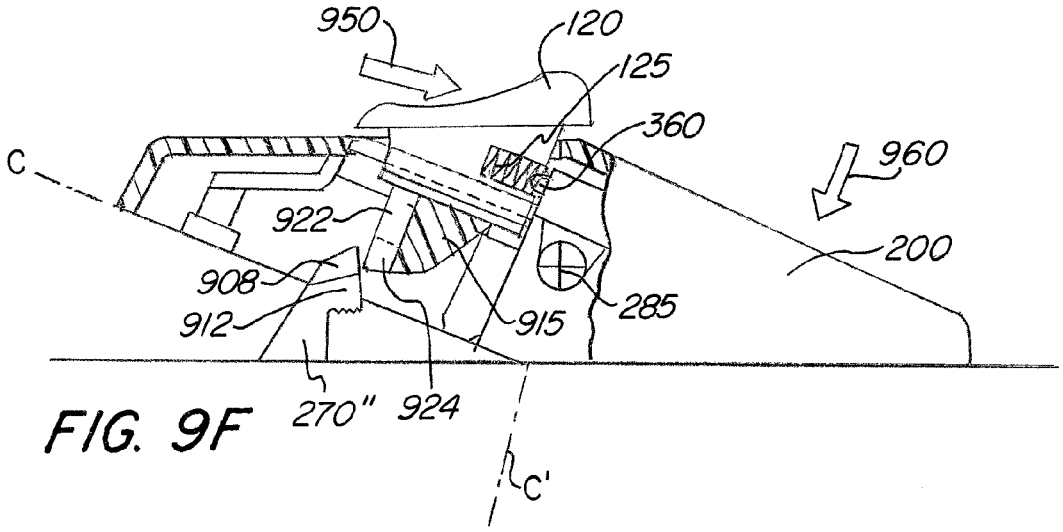


FIG. 9F

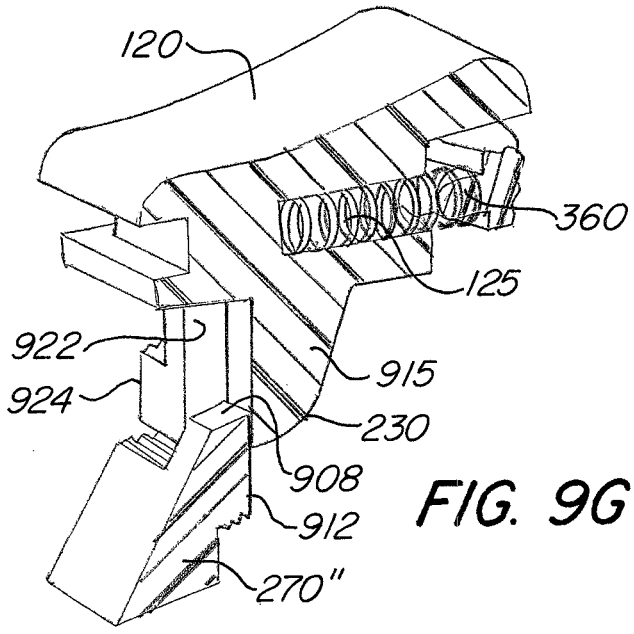

120
360
125
922
915
924
230
908
912
270"

FIG. 9G

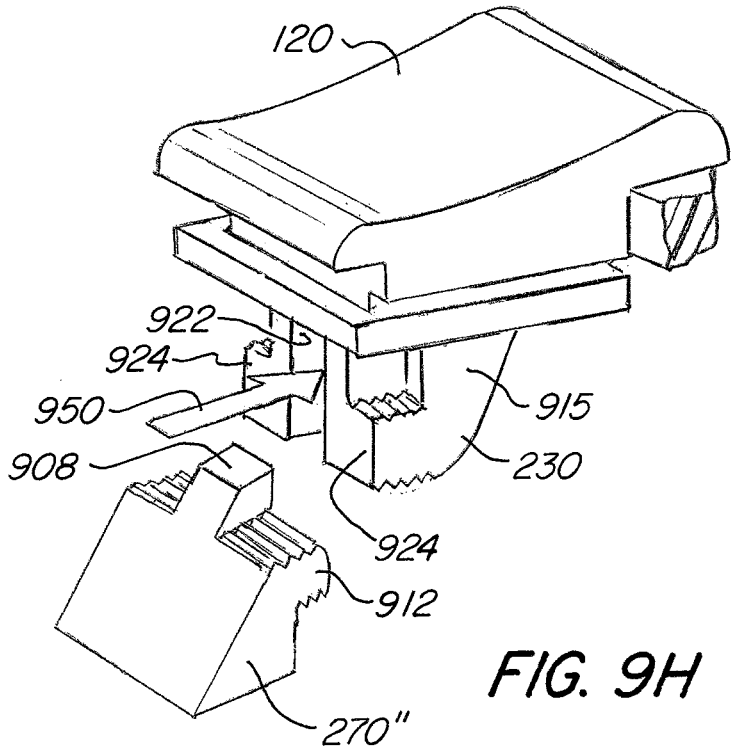

120
922
924
950
915
908
230
924
912
270"

FIG. 9H

TWO-PIECE ROCKER ASSEMBLY

FIELD OF THE INVENTION

The invention generally relates to electrical switches and more specifically relates to a two-piece rocker assembly for use in a rocker switch.

BACKGROUND OF THE INVENTION

Rocker switches are used as electrical switches in industry, domestically and in automobiles, boats and airplanes, for example. Because of their wide application and large scale manufacture, the unit price of rocker switches is relatively low. There are applications in which it is useful to take advantage of the low unit cost of rocker switches, and where it is desirable to enhance them.

Various rocker switch assemblies are known in the prior art. Rocker switch assemblies are made from a standard switch base, and a rocker assembly is typically mounted onto the switch base via a bracket, which is in turn mounted on the switch base. The rocker switch assemblies include protrusions that allow the rocker switch assembly to rock and pivot with respect to the bracket.

In the prior art, rocker switch assemblies have suffered from various deficiencies. Such deficiencies include the rocker switch not being aesthetically pleasing. Other deficiencies include various problems associated with rocker switches, such as the rocker switches not being easy to produce, and having various problems regarding the fit of the rocker assembly on the bracket and switch base, the fit being a result of poor manufacturing and production techniques. Other problems of prior art designs that include locks on rocker switches involve the lock on the rocker assembly falling out or becoming stuck, whereby the lock is prone to failure as it becomes stuck in use and fails over time due to poor manufacturing.

Prior art rocker switch assemblies have typically been made using a 2-step molding process, which requires expensive tooling and requires a step of overmolding, or molding two pieces onto one another to create the rocker switch assembly.

The 2-step molding process of the prior art has significant disadvantages as a 2-step molding process often results in shrinkage problems from overmolding, which results in production issues whereby components of the rocker switch assemblies do not fit correctly together.

As can be seen, a need exists to provide a rocker switch and rocker assembly that overcomes the disadvantages of the prior art.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the invention to provide for a two-piece rocker switch assembly (rocker assembly) that overcomes the disadvantages of the prior art. It is another object of the invention to provide a two-piece rocker assembly that is easy and inexpensive to produce.

These and other objects of the invention are achieved by providing a rocker switch comprising: a switch base; a bracket mounted on the switch base; and a rocker assembly mounted on the bracket, the rocker assembly able to pivot on the bracket, the rocker assembly including: an outer rocker having an interior body, the interior body of the outer rocker having at least one retention member; and an inner rocker having at least one latch beam that engages the at least one retention member to allow the inner rocker to be secured within the inner body of the outer rocker, the inner rocker being snap-fit within the outer rocker.

In certain embodiments, the outer rocker has four retention members and the inner rocker has four latch beams, wherein each of the four retention members are correspondingly engaged with one of the four latch beams to secure the inner rocker within the inner body of the outer rocker.

In certain embodiments, the inner rocker is secured to the outer rocker by snap-fitting the inner rocker within the inner body of the outer rocker, such that the snap-fitting occurs during assembly of the rocker switch.

In certain embodiments, the inner rocker has a body having a substantially rectangular shape and at least one opening within the body.

In certain embodiments, each of the four latch beams are located at each corner of the rectangular shape of the inner rocker and the four latch beams are each angled in a plane away from the body of the inner rocker. In certain embodiments, the four latch beams are angled approximately 45 degrees from the body of the inner rocker. In other embodiments, the four latch beams can be angled less than or greater than 45 degrees from the body of the inner rocker.

In certain embodiments, the inner rocker has a stem, the stem engaged with the switch base.

In certain embodiments, the at least one latch beam is snapped in underneath the retention member, such that the at least one beam is held in place by the retention member securing the inner rocker within the inner body of the outer rocker.

In certain embodiments, the outer rocker has at least one guide, the at least one guide able to locate and retain the inner rocker within the inner body of the outer rocker.

In certain embodiments, the inner rocker has at least one horizontal flange, the at least one horizontal flange able to engage with the at least one guide to retain the inner rocker within the outer rocker.

In certain embodiments, the outer rocker has four guides and the inner rocker has four horizontal flanges, the four guides engaged with the four horizontal flanges to retain the inner rocker within the outer rocker.

In certain embodiments, the inner rocker has four external flanges, the four external flanges engaged with the four guides to secure the inner rocker within the outer rocker.

In certain embodiments, the outer rocker has a window.

In certain embodiments, the rocker assembly includes a locking member, the locking member having a body located within a pocket between the inner rocker and the outer rocker.

In certain embodiments, the locking member is slidable within the pocket between the inner rocker and the outer rocker, wherein the locking member includes a sliding surface for sliding the locking member along a surface of the inner rocker.

In certain embodiments, the locking member includes a spring, the spring providing a force against the locking member sliding along the surface of the inner rocker.

In certain embodiments, the inner rocker includes a post, the post supporting a first end of the spring to prevent the locking member from sliding along the surface of the inner rocker and keeping the locking member in a closed position.

In certain embodiments, the locking member has a center hole for housing a second end of the spring, the spring being contained in a compressed state between the center hole of the locking member and the post located on the inner rocker.

In certain embodiments, the locking member includes locking features on the locking member, the locking features able to engage with corresponding locking features on the switch bracket.

In certain embodiments, the locking member has flanges on either side of the locking member, the flanges being captured in the pocket formed between the outer rocker and the inner rocker, the flanges being retained on the sliding surface for sliding the locking member along the surface of the inner rocker.

Other objects of the invention are achieved by providing a method for manufacturing a rocker switch, the method comprising the steps of: providing a switch base; mounting a bracket on the switch base; providing a rocker assembly including an outer rocker having at least one retention member and an inner rocker having at least one latch beam; snap-fitting the inner rocker within the outer rocker, so that the at least one latch beam is snap-fit within the at least one retention member to secure the inner rocker within the outer rocker; and mounting the rocker assembly on the bracket.

In certain embodiments, the method further comprises providing a locking member and placing the locking member between the outer rocker and inner rocker prior to snap-fitting the inner rocker within the outer rocker, so that the locking member is held in a pocket between the outer rocker and inner rocker.

In certain embodiments, the inner rocker and the outer rocker are manufactured separately. In certain embodiments, the inner rocker and the outer rocker are not manufactured via a 2-step molding process, but instead are manufactured separately and are snap-fit together during assembly.

Other objects of the invention are achieved by providing a rocker switch comprising: a switch base; a bracket mounted on the switch base; and a rocker assembly mounted on the bracket, the rocker assembly able to pivot on the bracket, the rocker assembly including: an outer rocker having four retention members; an inner rocker having four latch beams that each engage one of the four retention members to allow the inner rocker to be secured by the outer rocker; and a locking member, the locking member located with a pocket between the inner rocker and the window of the outer rocker, the locking member including a sliding surface for sliding the locking member along a surface of the inner rocker and a spring providing a force against the locking member sliding along the surface of the inner rocker, such that the locking member is able to move from a locked (engaged) position to an unlocked (disengaged) position by sliding the locking member longitudinally along the sliding surface of the inner rocker, wherein the inner rocker is secured to the outer rocker in a snap-fit manner.

Other objects of the invention and its particular features and advantages will become more apparent from consideration of the following drawings and accompanying detailed description. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a rocker switch of an embodiment of the present invention;

FIG. **2** is an exploded view of the rocker switch of FIG. **1**;

FIG. **3** is a bottom view of the outer rocker of FIG. **1**;

FIG. **4** is a bottom view of the rocker assembly of FIG. **1** with the inner rocker snap-fit within the outer rocker;

FIG. **5** is a perspective view of the locking member of FIG. **1**;

FIG. **6** is a cross-section view of the locking member held within the rocker assembly of FIG. **1**;

FIG. **7** is a perspective view of a rocker switch of another embodiment of the present invention;

FIG. **8** is an exploded view of the rocker switch of FIG. **7**;

FIGS. **9**A-**9**F are cross-section views of the locking member of FIG. **1** and its engagement with locking features on the switch bracket; and

FIGS. **9**G-**9**H are cross-sectional and perspective views of the interaction of the locking member of FIG. **5** with the locking feature of FIGS. **9**E-**9**F.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is directed to a new two-piece snap-fit rocker assembly for use in a rocker switch where the inner rocker snaps into the outer rocker. This overcomes issues in the prior art, which involves rockers assemblies manufactured by a 2-step over molding process whereby the inner rocker and outer rocker are molded together. The 2-step over molding process often results in shrinkage problems, which results in production issues whereby components of the rocker switch assemblies do not fit correctly together and/or have aesthetical problems. The 2-step over molding process also requires much more expensive tooling.

Turning now in detail to the drawings, FIG. **1** is a perspective view of a rocker switch **1000** of an embodiment of the present invention. Here, the rocker switch **1000** is shown having a rocker assembly **100** with a locking member **120**, the rocker assembly being mounted on bracket **110**. Bracket **110** is in turn mounted on a switch base **170**. The switch base **170** is a standard switch base and bracket **110** is a standard switch bracket. However, the rocker assembly **100** is a new 2-piece snap fit rocker assembly where the inner rocker snaps into the outer rocker (also referred to as a sub-rocker and rocker respectively) and includes a sliding lock **120** that is captured between the outer rocker and inner rocker.

Referring to FIG. **2**, an exploded view of rocker switch **1000** of FIG. **1** is shown. Rocker switch **1000** includes outer rocker **200** having a top surface **215** and a body **218**. The outer rocker **200** is shown having a window **210**. The body **218** of the outer rocker **200** is shown being curved such that the body **218** has an arc shape. In certain embodiments, the outer rocker **200** is made of a hard plastic material or an insulating material. In certain embodiments, the outer rocker is a shell or a cap. In certain embodiments, the outer rocker is manufactured as a single piece by using a mold and molding process.

In FIG. **2**, the locking member **120** is shown having ribs **220** that are ergonomic to suit an operator's finger. The locking member has flanges **235** and **237** (shown in FIGS. **2**, **5** and **6**) that retain the locking member in a cavity between the outer rocker **200** and the inner rocker **140**. The locking member also has locking features **225** and **230** that mate with corresponding locking features on the switch bracket **110**.

Also shown in FIG. **2** is spring **125**. In certain embodiments, spring **125** is a standard compression spring. The spring is used to hold the locking member in place in a

locked (engaged) position and when compressed exerts a force to hold the locking member in the locked (engaged) position.

Inner rocker **140** is also shown in FIG. **2**. Inner rocker **140** has four latch beams **240**, **245**, **250** and **255**. Latch beams **240**, **245**, **250** and **255** are shown as each being in a corner of the inner rocker **140**. Latch beams **240**, **245**, **250** and **255** are shown as being angled at **2** planes away from the body **140** of the inner rocker. In certain embodiments, the latch beams are flexible. In certain embodiments, the inner rocker is made of a hard plastic material or an insulating material. In certain embodiments, the inner rocker is a shell or a cap. In certain embodiments, the inner rocker is manufactured as a single piece by using a mold and molding process.

Inner rocker **140** also has various features **242** and **244** that snap onto the bracket pivot points **285** and **287** on the switch bracket **110**. In certain embodiments, the various features **242** and **244** extend away and substantially perpendicularly from the body of the inner rocker **140**. Inner rocker **140** is shown having windows **252** and **254**, as well as bore **256**. The purpose of window **254** is to allow the light path for rocker images. Bore **256** is used to maintain a more uniform wall thickness. The locking member fits within window **252** when engaged with inner rocker **140**. Window **252** and **254** allow the inner rocker to have a cavity, so that the inner rocker **140** is able to pivot along the bracket **110**. Inner rocker **140** is shown having a stem **260**. The stem **260** engages with the switch actuator. Inner rocker **140** also has pockets to guide and retain the lock flanges.

Furthermore, inner rocker **140** also has sliding surface **610** and **620**, whereby the locking member **120** is able to slide on the sliding surface **610** and **620** to actuate the lock.

FIG. **2** also shows inner rocker **140** having external flanges **262**, **264**, **266** and **268** as well as horizontal flanges **232**, **234**, **236** and **238**. The external flanges and horizontal flanges allow the inner rocker **140** to be secured within the body of the outer rocker **200**, as the external flanges **262**, **264**, **266** and **268** and horizontal flanges **232**, **234**, **236** and **238** fit with the outer rocker **200** to position the inner rocker **140** within the outer rocker **200**.

In certain embodiments, inner rocker **140** transmits light for image illumination and can accept paint. In certain embodiments, the inner rocker incorporates features to guide and retain the lock and prevent its extraction.

FIG. **2** also has a switch bracket **110** having an upper surface **265**. Located on the upper surface is locking feature **270** that corresponds to flanges **225** and **230** of the locking member **120**. Additional configurations of locking feature **270** are shown in FIGS. **9**A-**9**H. In certain embodiments, locking feature **270** may be replaced by one or more locking features of various configurations.

Switch bracket **110** also has a bore **280** that receives the stem **260**. The bore is supported by a support mount **275** and horizontal protrusions **285** and **287** as well as a tapered section **290**. The horizontal protrusions **285** and **287** engage with features **242** and **244** to snap onto the inner rocker **140** onto the switch bracket **110**. The inner rocker **140** is mounted on the support mount **275** and is able to pivot with respect to the support mount **275** and the tapered section **290**. In certain embodiments, the tapered section **290** is hollow, so that a cavity is formed that allows the inner rocker **140** to pivot along the bracket **110**. Upon pivoting of the inner rocker, the stem **260** is able to actuate the switch to turn the switch on and off.

Also shown in FIG. **2** is switch base **170** having a body **295** and electrical connections **150**, **150'** and **150"**. As shown there are three electrical connections, though additional or fewer electrical connections may be used in the invention.

FIG. **3** is a bottom view of outer rocker **200** of FIG. **1**. FIG. **3** shows the window **210** of the outer rocker as well as inner surfaces **350** and **355** of the outer rocker **200**.

Also shown are retention members **305**, **310**, **315** and **320**. The retention members **305**, **310**, **315** and **320** extend from the outer body **218** of the outer rocker **200**, such that the retention members **305**, **310**, **315** and **320** extend inwardly towards the center of the outer rocker **200**. In certain embodiments, the retention members **305**, **310**, **315** and **320** are located in the corners of the outer rocker **200**. In certain embodiments, the outer rocker **200** has a rectangular or substantially rectangular shape. In certain embodiments, the outer rocker **200** has an arc shape. In certain embodiments, the outer rocker **200** has a rectangular shape with curved edges connecting each of the sides of the outer rocker. In certain embodiments, the retention members **305**, **310**, **315** and **320** are part of the one-piece design of the outer rocker **200**. In certain embodiments, the retention members **305**, **310**, **315** and **320** each have a straight edge so as to mate with the latch members of the inner rocker **140**.

Outer rocker **200** also has guides **325**, **330**, **335** and **340**. The guides have an H-shape or have an open rectangular shape, where one end of the rectangle is open. The guides **325**, **330**, **335** and **340** are used to retain the inner rocker **140** within the outer rocker **200**. In certain embodiments, the guides **325**, **330**, **335** and **340** provide pressure on the external flanges and horizontal flanges of the inner rocker **140** to hold and secure the inner rocker **140** within the outer rocker **200**. In certain embodiments, crush ribs **390** and **392** are provided on the guide surfaces to ensure a tight fit with inner rocker **140**. Crush ribs **390** and **392** may be located on each side of the guides **325**, **330**, **335** and **340**.

FIG. **4** shows a bottom view of the inner rocker **140** after being snap-fit within the outer rocker **200**. As shown, the latch beams **240**, **245**, **250**, **255** correspond to retention members **315**, **305**, **320** and **310** respectively. The engagement of the four retention members **315**, **305**, **320** and **310** with the four latch beams **240**, **245**, **250**, **255** secures inner rocker **140** within the inner body of the outer rocker **200**. The latch beams **240**, **245**, **250**, **255** are snapped in below the retention members **315**, **305**, **320** and **310** and the force exerted by the retention members **315**, **305**, **320** and **310** on the latch beams **240**, **245**, **250**, **255** secures the inner rocker **140** in place.

Also shown are guides **325**, **330**, **335** and **340** assisting in retaining and securing the inner rocker **140** to the outer rocker **200**. The external flanges **262**, **264**, **266** and **268** as well as horizontal flanges **232**, **234**, **236** and **238** allow the inner rocker **140** to be secured within the body of the outer rocker **200**, specifically through the engagement with the flanges **325**, **330**, **335** and **340** of the outer rocker **200**.

Also shown in FIG. **4** is locking member **120** being placed into the cavity (pocket) between the inner rocker **140** and outer rocker **200**, so that the flanges **235**, **237** of the locking member **120** are inside the cavity between the inner rocker **140** and outer rocker **200**.

During the production method, the locking member **120** is placed into the cavity of the inner rocker **140** and outer rocker **200** so that the flanges **235**, **237** are inside the cavity. The inner rocker **140** is then snap fit into the outer rocker **200**. The locking member **120** is captured in the cavity between the inner rocker **140** and outer rocker **200**. In use, the locking member **120** is able to slide longitudinally within the cavity.

In FIG. **4**, the locking member **120** is held in place by a spring **125** whereby one end of the spring **125** is attached to post **360** on the inner rocker **140**. The spring **125** holds the locking member in a locked (engaged) position. If the spring **125** is actuated by moving the locking member **120**, the locking member **120** is moved to an unlocked (disengaged) position, whereby the rocker assembly **100** is able to pivot along the switch bracket **110**.

Also shown in FIG. **4** are various features **242** and **244** that snap the inner rocker **140** onto the bracket pivot point, allowing the inner rocker **140** and rocker assembly **100** to be retained by the switch bracket **110**.

FIG. **5** shows a perspective view of the locking member **120**. Locking member **120** has bore **420**, such that end of the spring **125** is housed within bore **420**. FIG. **5** also shows flanges **235**, **237**, the flanges **235**, **237** acting as wings to slide on the sliding surfaces **610**, **620** of the inner rocker **140**.

The locking member also has flanges **225** and **230** that correspond to various locking features on the switch bracket **110**. Locking member **120** is also shown having inverted bore sections **410** and **415** coring for injection molding. Flanges **235**, **237** also have vertical sections **425**, **430** respectively that allow for capture by the outer rocker **140**. This is shown more clearly in FIG. **6**.

FIG. **6** is a cross section view of locking member **120** held within the rocker assembly **100** of FIG. **1**. FIG. **6** shows the locking member **120** being held within the outer rocker **200** and inner rocker **140**. The flanges **235**, **237** having vertical sections **425**, **430** respectively are shown being retained by a sliding surface **610** and **620** of the inner rocker **140**. The locking member **120** is able to slide longitudinally along sliding surfaces **610**, **620** to move the locking member **120** from an unlocked (disengaged) to a locked (engaged) position, and in turn allowing the rocker assembly to pivot and change the switch setting.

Also shown in FIG. **6** is the bore **420** in the locking member **120** housing one end of the spring **125**. Latch beams **245** and **240** are also shown being retained by retaining members **305** and **315** respectively. Also shown are external flanges **262** and **266** interacting with the outer rocker **200** to secure the inner rocker **140** within the outer rocker **200**. Further shown are guides **325** and **335** used to retain the inner rocker **140**.

The locking member **120** and rocker assembly **100** provides permanent lock retention and prevents inadvertent lock removal during switch operation, which is a problem with some prior art designs.

The actuation locking member **120** is shown in FIGS. **9A-9F**, whereby the locking features **225** and **230** mate with the locking features **270**, **270'** and **270"** on the switch bracket **110**. Various embodiments are shown in FIGS. **9A-9F** demonstrating this engagement. Specifically, the lock down, lock mid and lock up positions are shown in both locked (engaged) and unlocked (disengaged) positions. FIGS. **9A-9B** show the lock down position, FIGS. **9C-9D** show the lock mid position and FIGS. **9E-9F** show the lock up position.

FIG. **9A** shows locking member **120** in a locked (engaged) lock down position whereby locking features **225** and **230** mate with flange **902** on the locking feature **270**. Locking feature **270** has a single finger-like flange **902** which extends laterally away from the locking feature **270** to receive the locking feature **230**.

In FIG. **9A**, the locking feature **230** is shown engaged with and below locking flange **902**, such that the top surface of flange **904** interacts with the bottom surface of flange **902**. In certain embodiments, the flange **904** is threaded or ribbed for better engagement with finger-like flange **902** on the locking feature **904**.

In FIG. **9A**, the rocker assembly **100** is shown being parallel to the switch bracket **110**. Furthermore, the spring **125** is shown being held in place via the post **360** and stop member **906** as flange **235** is being held in place on the sliding surface **610** of the inner rocker in the locked (engaged) position. Furthermore, the rocker assembly **100** is secured to the switch bracket **110** via the bracket pivot point **285**.

FIG. **9A** also shows the stem **260** being in the A' position, whereby the stem is angled to the right. This is the locked (engaged) lock down position whereby the rocker switch **1000** is turned off and the locking member **120** is in the locked (engaged) lock down position.

In FIG. **9B**, the locking member **120** is actuated by a movement shown by arrows **910** and **920** and is disengaged from the locking feature **270**. The actuation of the locking member **120** occurs through a user using force to push the locking member **120** horizontally to the right (as shown by arrow **910**) and then the user pushes the outer rocker **200** down (as shown by arrow **920**).

By moving the locking member **120** horizontally, this opens the lock and causes the locking member **120** to slide longitudinally (horizontally) along the sliding surface **610** of the inner rocker **140** to disengage the locking feature **230** from the locking feature **270**.

Once the locking feature **230** is disengaged from the locking feature **230**, the rocker assembly **100** is free to be able rock on the switch bracket **110**, so that the position of the stem moves from the A' position as the rocker switch **1000** is actuated. This allows the rocker switch **100** rock or pivot with respect to the switch bracket **110**.

FIG. **9C** shows another embodiment of the invention whereby the rocker assembly **100** is in the lock mid position. In FIG. **9C**, locking feature **270'** is shown having two finger-like flanges **902'**. FIG. **9C** also shows the stem being in the B' position whereby the rocker switch **100** is not parallel with the switch bracket **110**, as it is angled up and away from the switch bracket **110**. The stem is in the B' position, which causes actuation or partial actuation of the switch. This is the lock mid position.

In FIG. **9C**, the rocker assembly **100** is shown being a locked (engaged) position where the locking member **120** is spring-biased and locked and engaged in the center groove of the locking feature **270'** in the central position. The spring **125** is shown being held in place via the post **360** and stop member **906** as flange **235** is being held in place on the sliding surface **610** of the inner rocker. Furthermore, the rocker assembly **100** is secured to the switch bracket **110** via the bracket pivot point **285**.

FIG. **9D** shows the locking feature **230** disengaged from the center groove between flanges **902'** and **902'** of the locking feature **270'**. The disengagement of the locking feature **230** from the locking feature **270'** involves pushing the locking member **120** horizontally to the right (as shown by arrow **930**) and pushing the outer rocker **200** down (as shown by arrow **940**. This causes the disengagement of the locking features and allows the rocker switch **100** rock or pivot with respect to the switch bracket **110**.

FIG. **9E** shows another embodiment of the invention whereby the rocker assembly **100** is in the lock up position. In FIG. **9E**, locking feature **270"** is shown having a single finger-like flange **902"**. FIG. **9E** also shows the stem being in the C' position whereby the rocker switch **100** is not parallel with the switch bracket **110**, as it is angled up and

away from the switch bracket **110**. The stem is in the C' position, which causes actuation or partial actuation of the switch. This is the lock up position.

In the lock up position, the rocker switch **100** is at a greater angle away from the switch bracket than in the lock mid position.

In FIG. **9**E, the rocker assembly **100** is shown being a locked (engaged) position where the locking member **120** is spring-biased and locked and engaged under the locking feature **270"**. The spring **125** is shown being held in place via the post **360** and stop member **906** as flange **235** is being held in place on the sliding surface **610** of the inner rocker. Furthermore, the rocker assembly **100** is secured to the switch bracket **110** via the bracket pivot point **285**.

In FIG. **9**E, locking feature **230** has a body **915** having an extension member **922/924**. Extension member **922/924** is shown having an upper portion **922** and a lower portion **924**. The lower portion **924** is engaged with the flange **902"** on the locking feature **270"**, such that in the engaged lock up position the lower portion **924** of the extension member sits on flange **902"** and the body **915** is flush with a surface (top portion **908**) of the flange **902"**

Also shown is that locking feature **230** has flange **902"** having a top portion **908** and bottom portion **912**. The bottom portion **912** is engaged with the lower portion **924** of the extension member when in the locked position. The top portion **908** is engaged with the body **915** such that the body **915** is flush with the top portion **908**.

FIG. **9**F shows the locking feature **230** disengaged from the flange **902"** of the locking feature **270"**. The disengagement of the locking feature **230** from the locking feature **270"** involves pushing the locking member **120** horizontally to the right (as shown by arrow **95**) and pushing the outer rocker **200** down (as shown by arrow **960**). This causes the disengagement of the locking features and allows the rocker switch **100** rock or pivot with respect to the switch bracket **110**.

FIG. **9**G shows a cross sectional view of the engagement of the interaction of locking feature **230** with locking feature **270"** shown in FIGS. **9**E-**9**F. In FIG. **9**G, locking member **120** is shown having a locking feature **230**. Locking feature **230** has body **915** and extension member extension member **922/924**. Extension member **922/924** is shown having an upper portion **922** and a lower portion **924**. As shown, lower portion **924** has a larger width than upper portion **924**. The lower portion **924** is shown being able to engaged with the upper surface **912** of the bottom portion **912** of the locking feature **230**.

FIG. **9**H shows a perspective view of the engagement of the interaction of locking feature **230** with locking feature **270"**. Here, the locking feature **270"** is shown whereby top portion **908** extends above the bottom portion **912** and whereby the locking feature **230** and locking feature **270"** mate with one another through movement of the features along the direction of arrow **950**. Top portion **908** fits within a sleeve between flanges **924** of locking feature **230** when the locking features are engaged with one another.

In certain embodiments, the primary lock function of locking member **120** is to prevent inadvertent actuation of the switch (unwanted change of setting). The lock is spring loaded to stay in the desired lock position. The operator pushes the lock button to disengage the locking mechanism from the locking features (locking bracket) to change switch settings. The new design incorporates flanges on either side of the lock that are captured in a pocket formed between the inner rocker **140** and outer rocker **200** to prevent inadvertent lock extraction.

In certain embodiments, the locking features **270'** may be replaced by a locking feature with additional flanges and/or prongs, such as locking features **270** and **270"** shown in various embodiments of the invention.

FIG. **7** is a perspective view of a rocker switch **7000** of another embodiment of the present invention involving a non-locking rocker assembly **700**. Here, the rocker switch **7000** is shown having a rocker assembly **700** mounted on switch bracket **710**. Switch bracket **710** is in turn mounted on a switch base **770**. The switch base **770** is a standard switch base and bracket **710** is a standard switch bracket. However, the rocker assembly **100** is a new 2-piece snap fit assembly where the inner rocker snaps into the outer rocker.

FIG. **8** is an exploded view of the rocker switch **7000** of FIG. **7**. Referring to FIG. **8**, rocker switch **7000** includes outer rocker **800** having a top surface **815** and a body **818**. The body **818** of the outer rocker **800** is curved and has an arc shape. In certain embodiments, the outer rocker **800** is made of a hard plastic material or an insulating material. In certain embodiments, the outer rocker is a shell or a cap.

Inner rocker **740** is also shown in FIG. **8** and combined with outer rocker **800** forms rocker assembly **700**. Inner rocker **740** has four latch beams **840**, **845**, **850** and **855**. In certain embodiments, latch beams **840**, **845**, **850** and **855** are each in a corner of the inner rocker **740**. In other embodiments, the latch beams **840**, **845**, **850** and **855** are angled at a plane away from the body of the inner rocker **740**.

Inner rocker **740** also has various features **842** and **844** to snap onto the bracket pivot point. Inner rocker also has windows **852** and **854**, as well as bore **856**. Window **852** and **854** allow the inner rocker to have a cavity, so that the inner rocker **740** is able to pivot along the switch bracket **710**. Inner rocker **740** also has a stem **860**. The stem **860** engages with the switch actuator to turn the switch on and off. The inner rocker **740** also has pockets to guide and retain the lock flanges. Windows **852** and **854** can also be used to allow LEDs to illuminate the rocker **800**.

FIG. **8** also has external flanges **862**, **864**, **866** and **868** as well as horizontal flanges **832**, **834**, **836** and **838**. The external flanges and horizontal flanges allow the inner rocker **740** to be secured within the body of the outer rocker **800**. In certain embodiments, inner rocker **740** transmits light for image illumination and can accept paint.

FIG. **8** also has a switch bracket **710** having an upper surface **865**. Switch bracket **710** also has a bore **280** that receives the stem **860**. The bore is supported by a support mount **875** and vertical protrusions **885** and **887** as well as a tapered section **890**. The inner bracket **740** is mounted on the support mount **875** and is able to pivot with respect to the support mount **875** and the tapered section **890**. In certain embodiments, the tapered section **890** is hollow, so that a cavity is formed that allows the inner rocker **740** to pivot along the bracket **710**.

Also shown in FIG. **8** is switch base **870** having a body **895** and electrical connections **750**, **750'** and **750"**. As shown there are three electrical connections, though additional or fewer electrical connections may be used in the invention.

In certain embodiments of the invention the rocker assembly is a 2-piece snap together rocker/sub-rocker design incorporating self-centering truss like snap latches. The new design is an improvement over the prior art 2-shot over molding process that requires much more expensive tooling.

While the invention has been specifically described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation, and that various changes and modifications in

form and details may be made thereto, and the scope of the appended claims should be construed as broadly as the prior art will permit.

The description of the invention is merely exemplary in nature, and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

What is claimed is:

1. A rocker switch comprising:

a switch base;

a bracket mounted on the switch base; and

a rocker assembly mounted on the bracket, the rocker assembly able to pivot on the bracket, the rocker assembly including:

an outer rocker having an interior body, the interior body of the outer rocker having at least one retention member extending inwardly from an interior surface of the outer rocker;

an inner rocker snap-fit within the outer rocker, the inner rocker having at least one latch beam that is snapped below the at least one retention member to cause the inner rocker to be secured within the inner body of the outer rocker;

a locking member having a body slideable within a pocket between the inner rocker and the outer rocker;

a spring providing a force against the locking member; and

a post located on the inner rocker, the post supporting a first end of the spring to prevent the locking member from sliding along a surface of the inner rocker;

wherein the locking member has a center hole for housing a second end of the spring, the spring being contained in a compressed state between the center hole of the locking member and the post located on the inner rocker.

2. The rocker switch of claim **1**, wherein the outer rocker has four retention members and the inner rocker has four latch beams, wherein each of the four retention members are correspondingly engaged with one of the four latch beams to secure the inner rocker within the inner body of the outer rocker.

3. The rocker switch of claim **2**, wherein the inner rocker is secured to the outer rocker by snap-fitting the inner rocker within the inner body of the outer rocker, such that the snap-fitting occurs during assembly of the rocker switch.

4. The rocker switch of claim **2**, wherein the inner rocker has a body having a substantially rectangular shape and at least one opening within the body.

5. The rocker switch of claim **4**, wherein each of the four latch beams are located at each corner of the rectangular shape of the inner rocker and wherein the four latch beams are each angled in a plane away from the body of the inner rocker.

6. The rocker switch of claim **1**, wherein the inner rocker has a stem, the stem engaged with the switch base.

7. The rocker switch of claim **1**, wherein the at least one latch beam is snapped in underneath the retention member, such that the at least one beam is held in place by the retention member securing the inner rocker within the inner body of the outer rocker.

8. The rocker switch of claim **1**, wherein the outer rocker has at least one guide, the at least one guide able to retain the inner rocker within the inner body of the outer rocker.

9. The rocker switch of claim **8**, wherein the inner rocker has at least one horizontal flange, the at least one horizontal flange able to engage with the at least one guide to retain the inner rocker within the outer rocker.

10. The rocker switch of claim **9**, wherein the outer rocker has four guides and the inner rocker has four horizontal flanges, the four guides engaged with the four horizontal flanges to retain the inner rocker within the outer rocker.

11. The rocker switch of claim **10**, wherein the inner rocker has four external flanges, the four external flanges engaged with the four guides to secure the inner rocker within the outer rocker.

12. The rocker switch of claim **1**, wherein the outer rocker has a window.

13. The rocker switch of claim **1**, further comprising locking features on the locking member, the locking features able to engage with corresponding locking features on the switch bracket.

14. The rocker switch of claim **1**, wherein the locking member has flanges on either side of the locking member, the flanges being captured in the pocket formed between the outer rocker and the inner rocker, the flanges being retained on the sliding surface for sliding the locking member along the surface of the inner rocker.

15. A method for manufacturing a rocker switch, the method comprising the steps of:

providing a switch base;

mounting a bracket on the switch base;

providing a rocker assembly including an outer rocker having at least one retention member extending inwardly from an interior surface of the outer rocker and an inner rocker having at least one latch beam;

snap-fitting the inner rocker within the outer rocker, so that the at least one latch beam is snapped below the at least one retention member to secure the inner rocker within the outer rocker;

providing a locking member having a body slideable within a pocket between the inner rocker and the outer rocker;

providing a spring providing a force against the locking member;

providing a post located on the inner rocker, the post supporting a first end of the spring to prevent the locking member from sliding along a surface of the inner rocker;

wherein the locking member has a center hole for housing a second end of the spring, the spring being contained in a compressed state between the center hole of the locking member and the post located on the inner rocker; and

mounting the rocker assembly on the bracket.

16. The method of claim **15**, further comprising providing a locking member and placing the locking member between the outer rocker and inner rocker prior to snap-fitting the inner rocker within the outer rocker, so that the locking member is held in a pocket between the outer rocker and inner rocker.

17. A rocker switch comprising:

a switch base;

a bracket mounted on the switch base; and

a rocker assembly mounted on the bracket, the rocker assembly able to pivot on the bracket, the rocker assembly including:

an outer rocker having four retention members extending inwardly from an interior surface of the outer rocker;

an inner rocker having four latch beams, each one of the four latch beams being snapped below one of the

four retention members to cause the inner rocker to be secured within the outer rocker; and

a locking member, the locking member located within a pocket between the inner rocker and a window of the outer rocker, the locking member including a sliding surface for sliding the locking member along a surface of the inner rocker and a spring providing a force against the locking member sliding along the surface of the inner rocker, such that the locking member is able to move from a closed position to an open position by sliding the locking member longitudinally along the sliding surface of the inner rocker,

a post located on the inner rocker, the post supporting a first end of the spring to prevent the locking member from sliding along a surface of the inner rocker;

wherein the locking member has a center hole for housing a second end of the spring, the spring being contained in a compressed state between the center hole of the locking member and the post located on the inner rocker

wherein the inner rocker is secured to the outer rocker in a snap-fit manner.

18. A rocker switch comprising:

a switch base;

a bracket mounted on the switch base; and

a rocker assembly mounted on the bracket, the rocker assembly able to pivot on the bracket, the rocker assembly including:

an outer rocker having an interior body, the interior body of the outer rocker having at least one retention member;

an inner rocker having at least one latch beam that engages the at least one retention member to allow the inner rocker to be secured within the inner body of the outer rocker, the inner rocker being snap-fit within the outer rocker;

wherein the outer rocker has a window;

a locking member, the locking member having a body located within a pocket between the inner rocker and the outer rocker;

wherein the locking member is slidable within the pocket between the inner rocker and the outer rocker, wherein the locking member includes a sliding surface for sliding the locking member along a surface of the inner rocker;

a spring, the spring providing a force against the locking member sliding along the surface of the inner rocker;

wherein the inner rocker includes a post, the post supporting a first end of the spring to prevent the locking member from sliding along the surface of the inner rocker and keeping the locking member in a closed position; and

wherein the locking member has a center hole for housing a second end of the spring, the spring being contained in a compressed state between the center hole of the locking member and the post located on the inner rocker.

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